

单元测验查看

第五章 二叉树前半部分（5.1~5.4） 测验

1 一棵有510个结点的完全二叉树的高度为多少？（独根树高度为1）

What is the height of a complete binary tree with 510 nodes? (the height of a tree with only a root is 1)

（填空2 分）

数值精确： 9

2 一棵有512个结点的完全二叉树的高度为多少？（独根树高度为1）

What is the height of a complete binary tree with 512 nodes? (the height of a tree with only a root is 1)

（填空2 分）

数值精确： 10

3 在一棵非空二叉树中，若度为0的结点的个数n，度为2的结点个数为m，则有n=_____ (系统根据字符串匹配来判定答案，所以您的答案中请不要包含空格)

For a binary tree with at least one node, if there are n nodes with degree 0 and m nodes with degree 2, then n = _____ (This problem is judged by string matching, Please make sure your answer don't contain any blanks.)

（填空2 分）

文字精确： m+1

解析： 设这棵二叉树总共有k个结点。因为二叉树的边数等于结点数减去1，并且二叉树的度数只有3种，分别是0,1,2。由此可得， $2m+(k-n-m)=k-1$ 。化简得， $n=m+1$ 。Let the binary tree have n edges of a binary tree are 1 less than nodes, and there are only 3 kinds of degree, 0, 1, 2. So, $2m+(k-n-m)=k-1$. After simplification, $n=m+1$

4 下列关于二叉树性质的说法正确的有：（多选）

Which sentences of the followings are right about a binary tree's characterization: (There are more than one correct answers)

（多选3 分）

☐ A. 非空满二叉树的结点个数一定为奇数个。 The amount of nodes of a full binary tree with at least one node must be odd.(正确答案)

解析： 非空满二叉树只有度为0或者度为2两种结点，而这两种结点的个数差为1，所以加起来必为奇数。
There are only 2 kinds of nodes, which are with degree 0 or degree 2, in a binary tree with at least one node. And the difference of the amounts of these two kinds of nodes is 1, so their sum m

☐ B. 当一棵完全二叉树是满二叉树时，叶子结点不一定集中在最下面一层。 If a complete binary tree is a full binary tree, it will be possible that leaf nodes is not on the nethermost layer. (正确答案)

解析： 只要倒数第二层的度都为0或者2，此棵完全二叉树即为满二叉树，最下面一层不一定要全满。
If the degrees of nodes on the second layer in inverted order are 0 or 2, the complete binary tree is a full binary tree, so the nethermost layer doesn't need to be full.

☐ C. 一棵非空二叉树的为空的外部结点数目等于其结点数加1。 The amount of external null nodes in a binary tree with at least one node equals to its amount of nodes plus 1. (正确答案)

解析： 设度为0,1和2的结点数为 n_0 , n_1 和 n_2 ，那么为空的外部结点数目等于 $2n_0+n_1=n_0+n_1+n_2+1$ ，于是等于节点数加1。

☐ D. 非完全二叉树也可以用像完全二叉树那样使用顺序存储结构进行存储。 Sequential storing structure can also be used to store an incomplete binary tree just like to store a complete binary tree. (错误答案)

解析： 非完全二叉树无法知道每一层哪些位置缺了结点，不能像完全二叉树那样直接计算出两个儿子的编号，所以不能用顺序存储结构存储。
Since we don't know which locations are lack of nodes on each layer for an incomplete binary tree, we couldn't calculate the indexes of the two children directly. So sequential storing structure c

☐ E. 完全二叉树最多只有最下面的一层结点度数可以小于2。 For a complete binary tree, only the degrees of nodes on the nethermost layer could be less than 2. (错误答案)

解析： 倒数第二层也可以有度数为0的结点。The degrees of nodes on the second layer in inverted order could also be 0.

☐ F. 满二叉树的所有结点的度均为2。 All degrees of nodes in a full binary tree are 2.(错误答案)

解析： 结点度数还可以为0。The degrees could also be 0.

5 下列关于二叉树遍历的说法正确的有：

Which sentences of the followings are right about traversal of a binary tree:

（多选3 分）

☐



- A. 所有结点左子树为空的二叉树的前序和中序遍历顺序恰好一样。The sequences of preorder and infix order of a binary tree with all nodes without left child tree are the same. (正确答案)

解析： 前序为中左右，而中序为左中右，所有结点都没有左子树后，两者恰好一样。
Preorder is middle, left, then right, while infix order is left, middle, then right. If all nodes don't have left child tree, they are the same.
- B. 只有空二叉树和一个根结点的二叉树这两种二叉树的前序和后序遍历的顺序恰好一样。Only the sequences of preorder and post order of the binary tree with no nodes or only one node are the same. (正确答案)

解析： 前序为中左右，而后序为左右中，所以缺失左子树或者右子树都不能让两者一样。
Preorder is middle, left, then right, while post order is left, right, then middle. So lack of left child tree or right child tree couldn't make them the same.
- C. 所有结点右子树为空的二叉树的中序和后序遍历顺序恰好一样。The sequences of infix order and post order of a binary tree with all nodes without right child tree are the same. (正确答案)

解析： 中序为左中右，而后序为左右中，所有结点都没有右子树后，两者恰好一样。
Preorder is middle, left, then right, while infix order is left, middle, then right. If all nodes don't have left child tree, they are the same.
- D. 存在一棵非空二叉树，它的前序、中序和后序遍历都是一样的。There exists a binary tree with at least one node, whose preorder, infix order and post order are all the same. (正确答案)

解析： 只有一个根结点的二叉树满足要求。
A binary tree with only one node meets the condition.
- E. 前序和中序遍历的顺序恰好一样的二叉树，只能是空二叉树或者独根二叉树这两种情况。Only the sequences of preorder and infix order of the binary tree with no nodes or only one node are the same. (错误答案)

解析： 前序为中左右，而中序为左中右，所有结点都没有左子树后，两者恰好一样。所以所有结点左子树为空的二叉树也满足要求。
Preorder is middle, left, then right, while infix order is left, middle, then right. These two are the same when all nodes don't have left child tree. So a binary tree with all nodes without left child tree
- F. 所有结点右子树为空的二叉树的前序和中序遍历顺序恰好一样。The sequences of preorder and infix order of a binary tree with all nodes without right child tree are the same. (错误答案)

解析： 前序为中左右，而中序为左中右，所有结点都没有左子树后，两者恰好一样。所以所有结点左子树为空的二叉树才满足要求。
Preorder is middle, left, then right, while infix order is left, middle, then right. These two are the same when all nodes don't have left child tree. So a binary tree with all nodes without left child tree
- G. 所有结点左子树为空的二叉树的前序和后序遍历顺序恰好一样。The sequences of preorder and post order of a binary tree with all nodes without left child tree are the same. (错误答案)

解析： 前序为中左右，而后序为左右中，所以缺失左子树或者右子树都不能让两者一样。
Preorder is middle, left, then right, while post order is left, right, then middle. So lack of left child tree or right child tree couldn't make them.
- H. 所有结点右子树为空的二叉树的前序和后序遍历顺序恰好一样。The sequences of preorder and post order of a binary tree with all nodes without left child tree are the same. (错误答案)

解析： 前序为中左右，而后序为左右中，所以缺失左子树或者右子树都不能让两者一样。
Preorder is middle, left, then right, while post order is left, right, then middle. So lack of left child tree or right child tree couldn't make them the same.
- I. 只有空二叉树和一个根结点的二叉树这两种二叉树的中序和后序遍历的顺序恰好一样。Only the sequences of infix order and post order of the binary tree with no nodes or only one node are the same. (错误答案)

解析： 中序为左中右，而后序为左右中，所有结点都没有右子树后，两者恰好一样。所以所有结点右子树为空的二叉树也满足要求。
Infix order is left, middle, then right, while post order is left, right, then middle. These two are the same when all nodes don't have right child tree. So a binary tree with all nodes without right child tree
- J. 所有结点左子树为空的二叉树的中序和后序遍历顺序恰好一样。The sequences of infix order and post order of a binary tree with all nodes without left child tree are the same. (错误答案)

解析： 中序为左中右，而后序为左右中，所有结点都没有右子树后，两者恰好一样。所以所有结点右子树为空的二叉树才满足要求。
Infix order is left, middle, then right, while post order is left, right, then middle. These two are the same when all nodes don't have right child tree. So a binary tree with all nodes without right child tree

6 已知一棵树的前序遍历为ABDEGCF，中序遍历为DBGEACF，求这棵树的后序遍历。（字母和字母之间不要有空格）

The preorder sequence of a tree is ABDEGCF, and its infix order sequence is DBGEACF, please write down its post order sequence. (There is no blank space between letters)

（填空2 分）

文字精确：DGEBFCA

7 已知一棵树的中序遍历为DBGEACF，后序遍历为DGEBFCA，求这棵树的前序遍历。（字母和字母之间不要有空格）

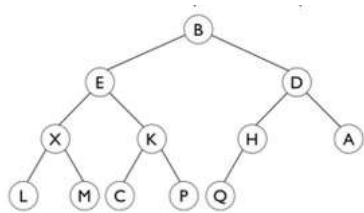
The infix order sequence of a tree is DBGEACF, and its post order sequence is DGEBFCA, please write down its preorder sequence. (There is no blank space between letters)

（填空2 分）

文字精确：ABDEGCF

8 请写出下面这棵二叉树的前序遍历（字母和字母之间不要有空格）

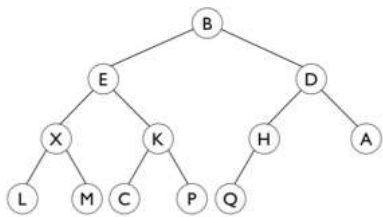
Please write down the preorder sequence of the following binary tree. (There is no blank space between letters)



(填空2 分)

文字精确: BEXLMKCPDHQA
解析: 根-左-右 root-left-right

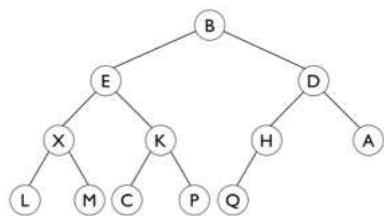
9 请写出下面这棵二叉树的中序遍历 (字母和字母之间不要有空格)
Please write down the infix order sequence of the following binary tree. (There is no blank space between letters)



(填空2 分)

文字精确: LXMECKPBQHDA
解析: 左-根-右 left-root-right

10 请写出下面这棵二叉树的后序遍历 (字母和字母之间不要有空格)
Please write down the post order sequence of the following binary tree. (There is no blank space between letters)



(填空2 分)

文字精确: LMXCPKEQHADB
解析: 左-右-根 left-right-root